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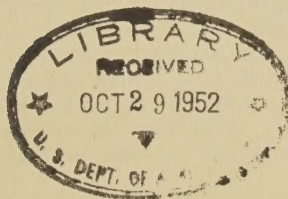
✓ FIELD APPRAISAL ANALYSIS //

Prepared by
Program Analyst
Office of the Administrator
✓ RURAL ELECTRIFICATION ADMINISTRATION

Field Appraisal
Completed in
May 1952

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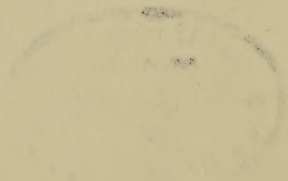


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September 8, 1952

Program Analyst
Office of the Administrator

SUMMARY AND CONCLUSION

AREA CHARACTERISTICS

The proposed system area lies primarily in White Pine County, Nevada. The area has decreased in population by more than 20 percent over the last decade. Most of the population are Mormons. Farms average over 1,000 acres, and although the size of farm increased only 29 percent between 1945 and 1950, the average value increased 173 percent. Income per farm from sale of farm products averaged \$15,400 in 1949. Tenancy in the area is low.

Livestock accounts for more than 95 percent of all income received from farm products. Most stock are sold as feeders. More than 90 percent of the farmers in the general area irrigate 25 percent of the land in crops.

Although nearly 80 percent of the farms were reported as having electricity on April 1, 1950, only about one-half were receiving it from a power line. Twenty-six percent of the farmers had telephones.

Several minerals, the principal one of which is copper, are found in this area. Elevation ranges from 5,000 feet to as high as 13,000 feet above sea level.

ULTIMATE NUMBER OF CONSUMERS

The proposed system expects to serve a total of 232 consumers immediately upon energization and increase this number by 23 percent to a total of 293 by the end of 5 years. Although the appraiser noted that some of the potentials were vacant homes, it is his opinion that the cooperative's estimates are reasonable.

ESTIMATED FUTURE CONSUMPTION OF ELECTRICITY

Farmers indicated an average monthly usage of 644 kwh to be attained 3 years following energization. Nonfarm and town residential consumers indicated an average of 452 kwh to be attained over the same period. As a general observation, respondents' indications of future usage of electricity in the past have been optimistic. The extent to which conversion of appliances and equipment used on home plants or operated with other energy is necessary will affect the time required for consumers to achieve their indicated future usage. There are several reasons why a large initial usage might be expected on this system. Some of these are: (1) Fifteen percent of the farm potential consumers have more than one dwelling. (2) All potentials are receiving service either from inadequate central station plants or home plants and have in their possession many of the appliances and equipment they plan to use. (3) Incomes are high and appliances are generally available. (4) Alternative sources of energy cannot compete with electric power at the proposed cost to consumers in the proposed system.

2-Summary - Nevada 5 White Pine - September 8, 1952

Based on the indications of the random sample of potential consumers, operations of neighboring cooperatives, and other economic factors believed to bear upon the use of electricity in this area, the following estimates are certified as reasonable and are likely to be attained at periods following energization as specified:

<u>Class of Consumer</u>	<u>Average Monthly Kwh to be Attained Following Energization</u>		
	<u>In 2 Yrs.</u>	<u>In 5 Yrs.</u>	<u>In 10 Yrs.</u>
Farm	435	575	780
Nonfarm and town	300	450	575
Irrigation ^{1/}	22,000	22,000	22,000

^{1/} Annual estimate per well.

E. C. Weitzell, Program Analyst
Office of the Administrator

September 8, 1952

Program Analyst
Office of the Administrator

ANALYSIS OF BASIC FACTORS RELATED TO THE
RURAL ELECTRIFICATION LOAN FOR
NEVADA 5 WHITE PINE

This analysis of the probable future consumption of electricity for the White Pine Power District Number 9 to serve parts of White Pine, Nye and Lincoln Counties, Nevada, with short extensions into Millard and Beaver Counties, Utah, is based on a field study conducted by Vergil Bufford, Agricultural Economist, and was completed during May 1952. The field work consisted primarily of visits to 41 potential farm and 36 town residential consumer units. A map of the possible service area is shown as Figure 1.

ULTIMATE NUMBER OF CONSUMERS

Table I gives the cooperative's estimates of the number of consumers who will take service. Those expected to be connected immediately upon energization have been signed. The estimates for number of consumers in 5 years were also provided by the cooperative. Although the appraiser noted that some of the potentials listed were vacant homes, assuming normal growth for an area of this type it is the appraiser's opinion that the cooperative's estimates are reasonable.

TABLE I
ESTIMATED NUMBER OF CONSUMERS BY CLASS,
INITIALLY, AND 5 YEARS FOLLOWING ENERGIZATION

Consumer Class	Estimated Number of Consumers	
	Initially	5 Years Following Energization
Town Residentials	83	103
Farm and Ranch	67	86
Nonfarm Rural	12	20
Irrigation	45	55
Small Commercial	14	18
Medium Commercial*	4	7
Schools and Churches	7	9
Total	232	298

*Between 25 and 200 KVA.

1/ Respondents in the survey were randomly selected from tabular lists and comprise a sample of one-half of the farms and one-third of the town residences proposed to be served in the area.

Nevada 5 White Pine - September 8, 1952

The 5-year estimate as provided by the cooperative indicates an increase in consumers by 28 percent over those expected to take service immediately upon energization. The appraiser was of the opinion that the greatest potential for future growth lies in the extension of power for irrigation.

Of the seven farm potential consumers drawn in the sample, three of the homes were vacant and a fourth was too far from proposed lines to expect service. Two town residences listed as potential users that were visited were vacant.

NATURE OF PRESENT AND INDICATED FUTURE
CONSUMPTION OF ELECTRICITY AS REVEALED BY THE SURVEY

A tabulation of the raw data secured from the respondents revealed the following average monthly consumption figures.

TABLE II
INDICATED MONTHLY KWH CONSUMPTION

Consumer Class	Present	Future
Farm ^{1/}	28	644
Nonfarm and town residential	160	452

^{1/} Includes ranch as used in this analysis.

In general, nonfarm and town residential consumers in the sample were presently receiving service from the small plants now in operation, whereas practically none of those consumers classified as farm were receiving central station service at the time of the appraisal.

Table III reveals in detail the present and expected future saturation of appliances for all respondents in the survey as indicated by them at the time of the appraisal.

TABLE III

PERCENT OF SERVED AND UNSERVED FARM, NONFARM, AND TOWN RESIDENTIAL CONSUMERS
USING AND PLANNING TO USE ELECTRICAL APPLIANCES AND EQUIPMENT AND INDICATED
ANNUAL KWH USAGE PER 100 FARM, NONFARM, AND TOWN RESIDENTIAL CONSUMERS
WITHIN THREE YEARS AFTER THE PROPOSED SYSTEM IS ENERGIZED

Appliance or Equipment	Percent of Consumers			Annual		Indicated Annual Kwh Usage		
	Using:	Planning:	Using and:	Kwh	:	Per 100 Farm Consumers		
	: To Use	: Planning	: Using	: Usage	:	Present	: Future	: Total
	:	: To Use 1/	: Per	: Unit 2/	:	Use	: Use	: Indicated
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	Future Use 3/

MAJOR USES:

House Lighting	41	59	100	300	12,300	21,000	33,300
General Barn Lighting	6	28	34	24	144	816	960
Dairy Barn Lighting	9	2	11	35	315	70	385
Poultry Laying House Lighting	5	26	31	35	175	980	1,155
Yard Lighting	11	59	70	18	360	3,060	3,420
Iron	41	57	98	100	4,100	6,800	10,900
Ironer	--	28	28	120	--	3,600	3,600
Radio	39	59	98	100	5,300	8,100	13,400
Refrigerator	37	61	98	360	14,040	26,280	40,320
Range	3	73	76	1,200	3,600	97,200	100,800
Washing Machine	39	52	91	35	1,435	2,170	3,605
Pres. System - Lift 22' or Less	5	17	22	180	900	3,060	3,960
Pres. System Lift over 22'	22	31	53	240	5,280	7,440	12,720
Space Heater (Supplementary)	3	6	9	70	210	770	980
Freezer (Cabinet)	19	59	78	900	18,000	54,900	72,900
TV Receiver	--	3	3	360	--	1,080	1,080
Water Heater	--	67	67	3,000	--	234,000	234,000
Air Conditioning Unit	--	2	2	2,000	--	4,000	4,000
Welder	2	37	39	75	150	2,775	2,925
Feed Grinder or Roller	3	8	11	1,634	4,902	13,072	17,974
Brooder - Hov.	2	34	36	235	470	7,990	8,460
Milking Machine	9	2	11	503	4,527	1,006	5,533
Milk Cooler	5	3	8	2,542	12,710	7,626	20,336

2-Table III - Nevada 5 White Pine - September 5, 1952

Appliance or Equipment	Percent of Consumers			Annual : Kwh : Per Unit 2/	Indicated Annual Kwh Usage		
	Using:	Planning:	Using and:		Per 100 Farm Consumers		
	: To Use	: Planning	: Usage		: Present	: Future	: Total
	: :	: To Use 1/	: Per		: Use	: Use	: Indicated
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
							Future Use 3/

MAJOR USES: (Cont'd)

Water Heater (Dairy)							
Four-in Type	9	--	9	1,500	13,500	--	13,500
1 Room Cabin	--	2	2	12	--	24	24
2 Room Cabin	--	2	2	24	--	48	48

OTHER LIGHTING:

Poultry Brooder House	--	3	3	5	--	15	15
Grain & Feed Stor. Bldg.	3	12	15	2	6	24	30
Garage	6	30	36	8	48	240	288
Shop	2	31	33	12	24	372	396
Punk House	3	23	26	15	45	450	495
Cave or Spring House	2	5	7	5	10	25	35
Other Buildings	7	23	30	12	96	432	528

OTHER HOUSEHOLD USES:

Sewing Machine	14	36	50	10	140	410	550
Household Fan	3	38	41	15	45	705	750
Ventilator (Attic)	--	2	2	100	--	200	200
Vacuum Cleaner	30	59	89	20	600	1,030	1,680
Heating Pad	17	30	47	3	51	99	150
Central Hot Air Cir. Fan	--	3	3	240	--	720	720
Coal Stoker	--	16	16	240	--	3,840	3,840
Oil Furnace	--	12	12	300	--	3,600	3,600
Hot Plate	3	3	6	70	210	210	420
Percolator	13	45	58	60	780	3,180	3,960
Roaster	3	13	16	480	1,440	7,680	9,120
Toaster	25	62	87	35	875	2,555	3,430
Waffle Iron	25	50	75	25	625	1,450	2,075
Food Mixer	25	52	77	25	625	1,525	2,150
Dishwasher	--	8	8	30	--	240	240
Clock	2	61	63	18	36	1,206	1,242
Blanket	2	22	24	150	300	4,650	4,950
Churn	--	3	3	3	--	9	9

3-Table III - Nevada 5 White Pine - September 5, 1952

Appliance or Equipment	Percent of Consumers			Annual		Indicated Annual Kwh Usage		
	Using:	Planning:	Using and	Kwh		Per 100 Farm Consumers		
	: To Use	: Planning	: Usage	: Present	: Future	: Total		
	: (1)	: (2)	: (3)	: Unit 1/ (4)	: (5)	: (6)	: (7)	: Future Use 2/ (8)
<u>OTHER FARM SHOP</u>								
<u>USES:</u>								
Air Compressor	--	27	27	35	--	945	945	
Drill Press	9	47	56	12	108	564	672	
Tool Grinder	11	45	56	25	275	1,125	1,400	
Power Saw	2	9	11	12	24	108	132	
Battery Charger	--	5	5	12	--	60	60	
Lathe	--	2	2	12	--	24	24	
Forge	--	9	9	12	--	108	108	
Soldering Iron	--	8	8	15	30	105	135	
<u>OTHER GENERAL</u>								
<u>PRODUCTIVE USES:</u>								
Seed Cleaner	2	--	2	3	6	--	6	
<u>OTHER POULTRY USES:</u>								
Water Warmer	--	16	16	60	--	960	960	
<u>OTHER DAIRY USES:</u>								
Cream Separator	2	6	8	35	70	210	280	
<u>OTHER LIVESTOCK USES:</u>								
Stock Tank Heater	3	11	14	150	450	3,750	4,200	
Fence	--	2	2	50	--	100	100	
TOTAL ANNUAL KWH USAGE PER 100 FARM, NONFARM, AND								
TOWN RESIDENTIAL CONSUMERS					109,337	550,843	660,180	
ANNUAL KWH USAGE PER CONSUMER					1,093	5,509	6,602	
MONTHLY KWH USAGE PER CONSUMER					91	459	550	

Source: Field appraisal completed in May 1952.

4-Table III - Nevada 5 White Pine - September 5, 1952

- 1/ Percent of all served and unserved farm, nonfarm, and town residential consumers who were using or planning to use electrical appliances and equipment listed, within three years after the proposed system is energized as indicated by interviews with 64 respondents comprising a 40 percent random sample drawn from tabular lists.
- 2/ Annual kwh average usage as determined by REA. Annual data used to account for seasonal variations.
- 3/ The total indicated annual kwh usage shown in this column does not necessarily equal column 4 times column 3. Some consumers have or plan to have more than one of a particular appliance, or more than one of several different appliances.

ECONOMIC CHARACTERISTICS

Although the proposed system is to extend beyond the limits of White Pine County, Nevada, the number of consumers to be served outside this county are relatively few. To provide a generalized background of economic information on this area, census data for 1950 for White Pine County are used. On April 1, 1950, there were 9,424 persons in White Pine County, or a decrease of 23.9 percent under the 12,377 persons residing there in 1940. Farms have also decreased in number, falling from 157 in 1945 to 148 in 1950. Most of the population are Mormons. There has been a substantial increase in the value of land and buildings per farm between 1945 and 1950. Whereas the size of farms increased by only 29 percent over this period, the value increased 173 percent. Income per farm from sale of farm products in 1949 averaged \$15,400.

The Farmers Home Administration reports that of advances made in the general area wherein this cooperative is located as of December 31, 1951, nearly 20 percent are delinquent. Local banks show a ratio of deposits to loans of 3.64 to 1. Livestock accounts for more than 95 percent of all income received from the sale of farm products (Figure 2). Only a small percent of the cattle and sheep are fed within the area. Most stock is sold as feeders, and about 75 percent go to the Pacific Coast, the remainder to Twin Falls, Idaho. Many buyers visit the area and markets are generally regarded as being firmly established. More than 90 percent of the farms report irrigating some land.

Farms in this area average more than 1,000 acres, and it is not uncommon for a farm to have two or three dwellings on it. Tenancy in the area is low. Although 78 percent of the farms were reported as having electricity on April 1, 1950, only 42 percent were receiving it from a power line. Twenty-six percent of the farms had telephones.

The majority of the consumers for this proposed system are concentrated in two locations (Figure 3). One of these is described as the Baker-Garrison area and is located in the eastern part of the proposed service area. This locality consists of large ranch operations. Many purebred beef herds are found here. Hay and grains are raised but primarily used within the area as feed for the livestock. Livestock numbers tend to be on the increase.

The other local area is described as the Preston-Lund area and is in the southwest part of White Pine County. Most of the farm operators live in one of these two small towns and do their farming on land that is adjacent to or near these villages. In the town of Lund, 15 of the families were engaged in dairying, and the herds and milk barns were regarded as being within the limits of the town. The farming operations in this area were much smaller than those in the Baker-Garrison area. It was estimated that

in 1951, 40 percent of the feed to supply the dairy herds was imported. At present 950 gallons of milk are being supplied daily, and an increase to 1,200 gallons is anticipated. Markets for this milk include the towns of Ruth, Kimberly, Ely, McGill and Wendover.

PHYSICAL CHARACTERISTICS

Topographically, the service area is in the Great Basin Province, which is characterized by north and south trending mountain chains, which rise as high as 6,000 feet above the intervening valleys. The valleys are broad but greatly elongated north and south, and their floors are from 5,000 to 7,000 feet above sea level. Precipitation is much greater in the higher mountain areas than in the valleys. Soils in the valleys are of unconsolidated gravel, sand, silt and clay. Climate is arid to semiarid owing to the low precipitation and high rate of evaporation. Temperatures vary from 105° to minus 27° F. The frost-free period varies from 90 to 120 days, depending upon altitude. The grass-growing season is considerably longer than the frost-free period.

Several minerals, the principal one of which is copper, are found in the area. Ely is in the center of one of the world's great copper-producing districts. Open cut mining through the years has created a tremendous hole at Ruth, resembling a stadium, a mile long, three-quarters of a mile wide and 650 feet deep. Each day, approximately 17,000 tons of ore are taken from this pit with an equal amount of waste. The ore contains about 20 pounds of copper per ton and is hauled 23 miles by rail to the reduction plant at McGill. The total production from this operation, centered at Ely, is over 3 billion pounds of copper, 1½ million ounces of gold and 10,000 ounces of silver. Other large and well established mines exist within the area and are to be served by the proposed system.

COMPETITIVE SOURCES OF ENERGY

Costs of energy which would likely compete with electricity in this area are regarded as high. Gasoline sells for 28 cents per gallon; diesel fuel is 18 cents per gallon and propane sells for \$9.25 per 24-gallon cylinder, f.o.b. Ely. This high cost of alternative sources of energy is reflected in the following table which indicates the respondents' intentions for using gas when central station service is made available. It should be noted that more than three-quarters of the respondents are either not using or planning to use gas or definitely intend to change all appliances from gas to electricity.

TABLE IV

STATUS OF GAS USE, 60 RESPONDENTS
REPORTING IN RANDOM SAMPLE SURVEY

<u>Consumers' Position With</u> <u>Respect to Use of Gas</u>	<u>Number of</u> <u>Respondents</u>	<u>Number of</u> <u>Appliances</u>	<u>Percent</u> <u>of Total</u>
Not using and not planning to use	28		47
Not using but planning to use	1		2
Using			
but planning to change to electricity	18		30
but not planning to change to electricity	8		13
but changing only partly to electricity	5		8
Appliances presently being operated with gas			
range		28	41
water heater		13	19
refrigerator		22	32
househeating		4	6
chick brooder		1	2

ANALYSIS OF KWH CONSUMPTION

Consumers Classified as "Farm"

The estimate for farm consumers for this proposed system is based on the sample data, other economic information available from the area, and secondary sources.

Respondents in the survey in this class indicated they planned to use an average of 644 kwh per month within 3 years following energization. Table V shows the major components of the load these farm potential consumers expect to attain. Although it was observed that many potentials had appliances and were presently using them with power generated by home plants, experience has shown that respondents in general tend to be optimistic regarding the extent to which they intend to use electricity when available. The extent to which conversion from appliances and equipment used on home plants or operated with other energy is necessary will affect the time required for consumers to achieve their indicated future usage.

There are several factors which will have a favorable effect on usage on this system, however. Although LP gas is used for cooking, water heating and refrigeration in the area, the future potential of that commodity as a

competitive source of energy appears unfavorable. Approximately 10 percent of the farm potential consumers will continue to use gas for one purpose or another following system energization. This is not inconsistent with the indicated expected saturations of major appliances as shown in Table V. Another factor which will increase the average kWh per farm is the fact that in 15 percent of the cases there are two or more dwellings per farm. This will raise the average expected usage per farm. Consumers in the area presumably have the money to purchase the appliances they indicate they will use. Also, at the present time there is no apparent shortage of these appliances.

The appraiser has reported several reasons for expecting a large use of electricity on this proposed system immediately upon energization. These include: (1) Every farm home at present has a home plant operating 24 hours a day. (2) Most of the appliances indicated to be used are presently in use and will be on the line the day the system is energized. (3) Farms were signed at relatively high minimums (as high as \$45 per month). It will be to their advantage to go "all out electric." (4) Costs are higher to operate home plants than the minimum guarantee required. Some respondents told the appraiser that if a larger monthly guarantee were needed they would be willing to provide the necessary increase. Certainly adequate consideration should be given to these factors. There is, however, the question as to how uniformly these conditions prevail throughout the area. From careful study of the field report, it is believed that they pertain primarily to exceptionally large operators whose guaranteed minimums were in the highest bracket. Data in the application reveal that more than one-half of the signed members indicated the willingness to pay a \$7.50 monthly minimum at the beginning and only 7 percent were willing to guarantee a minimum of over \$25.

Insofar as water heaters are concerned, it might reasonably be expected that 65 percent of those indicated will be installed in 3 years. For ranges and freezer cabinets, 80 percent of the indicated might be attained in 3 years. All consumers are expected to have refrigerators. Reasons for this are believed to be that (1) the people have not accepted such competing sources of energy as LP and Butane gas and (2) in areas of livestock production food freezers are becoming generally recognized as economic "musts" for the household. It is believed that productive and other uses will be added at a rate of about 80 percent within the next 3 years.

Nevada 5 White Pine - September 8, 1952

TABLE V
INDICATED AND ESTIMATED KWH USAGE, FARM
CONSUMERS BY CHARACTER OF LOAD

Use	Saturation	Indicated		Estimated Annual
		Per 100 Consumers	Percent of Total	Per 100 Farm Consumers
			Kwh	Kwh
Major Household Uses				
Water Heater	76	291,000	37.6	189,150
Range	82	116,400	15.1	93,120
Freezer Cabinet	81	76,320	9.9	61,056
Refrigerator	100	44,712	5.8	44,712
House Lighting	100	36,360	4.7	36,360
Productive Uses	---	96,518	12.5	77,214
Other Uses	---	111,094	14.4	83,875
Total		772,404	100.0	590,487
Annual average estimated kwh for farm consumers 3 years following energization				5,905
Monthly average estimated kwh for farm consumers 3 years following energization				493

Historical data on two REA-financed systems operating in the general area wherein White Pine County is also located reflect the wide divergence in historical consumption growth which may be associated with this area.

TABLE VI
COMPARATIVE DATA ON TWO NEIGHBORING SYSTEMS

	Years Energized	Income from Sale of Farm Products	Average Size of Farm	Average Monthly Kwh	
				Calendar 1946	Increase Per Year 1946-1951
System A	12	9,513	372	145	23
System B	13	5,022	152	477	60

Nevada 5 White Pine - September 8, 1952

The area presently under consideration is considerably different with respect to size of farm and farm income. White Pine County farms averaged more than 1,000 acres and had incomes from sale of farm products that averaged \$15,400. It is interesting to note, nevertheless, that of the two systems used to reflect actual operations, the system with smaller farms having less income were at a higher level of kwh usage and were increasing at a faster rate.

To establish initial farm consumption estimates, an average of these two systems' average consumption for 1946 is used. This consumption reveals the use of consumers after they had been on the system for some time and a base point from which postwar increases were accomplished. The prewar and wartime growth of these neighboring cooperatives may be paralleled with the growth in electrical usage attained with home plants on subject system. This establishes the average expected consumption upon energization at 311 kwh per month for the farm consumers. The estimate of 493 has been derived from indications of consumers as likely to be achieved in 3 years following energization. Using an initial consumption of 311 kwh, 493 in 3 years and the average rate of 41 kwh per year, average increase in neighboring systems, as the rate of increase for the remaining years of 10 on subject system the estimates of 435 in 1954, 575 in 1957, and 780 in 1962 are believed to be realistic.

Consumers Classified as "Nonfarm and Town Residential"

Nonfarm and town residential consumers who were interviewed in connection with the survey indicated expected consumption pattern for future use of electricity to contain as much for farm productive uses percentage-wise as was true in the case of farm consumers. This was primarily due to the existence of dairying activities in connection with several of this class of respondent.

According to information contained in the application, consumers in the town of Lund used an average of 115 kwh in 1951. For all respondents in this class, the survey indicated their present usage to be 160 kwh per month. Consumers in the Lund area recognize the inadequacy of their present source of power. Rates at present start at 25 cents per kwh. There are severe voltage fluctuations and occasional outages.

Consumers in this class indicated they would attain a monthly average kwh of 452 within 3 years following energization. Appraising the indicated future use in light of the appraiser's observations in the area, it is believed that the major appliances will be added in towns at about the same rate of the future indicated figure as in the case of farm consumers. It is believed that all milk coolers and dairy water heaters indicated will be added in the 3-year period. Considering the respondent's indications, the present consumption of these consumers and their power problems, as well as the prospects for use of power and related economic factors, it is estimated that town consumers will use an average of 359 kwh per month within 3 years following energization.

Nevada 5 White Pine - September 8, 1952

TABLE VII

INDICATED AND ESTIMATED KWH USAGE, NONFARM AND TOWN
RESIDENTIAL CONSUMERS, BY CHARACTER OF LOAD

Use	Saturation	Indicated		Estimated Annual Kwh Consumption Per 100 Consumers
		Per 100 Consumers	Kwh Percent of Total	
Major Household Uses				
Water Heaters	58	174,000	32.1	113,100
Range	71	85,200	15.7	68,160
Freezer	74	69,300	12.8	55,440
Refrigerator	97	36,000	6.6	36,000
Lighting	100	30,000	5.5	30,000
Milk Cooler	10	28,700	5.3	28,700
Dairy Water Heater	13	19,500	3.6	19,500
Other Productive Uses	---	18,083	3.3	14,470
Other Uses		81,788	15.1	65,430
Total		542,576	100.0	430,800

Estimated annual average kwh consumption for nonfarm and town
residential consumers to be attained 3 years following energization 4,308
Estimated monthly average kwh consumption for nonfarm and town
residential consumers to be attained 3 years following energization 359

Starting with an over-all present average use of 160 kwh and the estimated 359 to be attained in 3 years assumes an increase in the average monthly kwh at the rate of 66 kwh annually. For the neighboring system designated as "B" in the previous section, town consumers averaged 274 kwh in 1946 and increased at the rate of 50 kwh per month for each year from 1946 to 1951. To establish the trend in expected consumption for nonfarm and town residential consumers, 160 kwh is used as the initial average, 360 as an average to be attained in 3 years. The 10-year estimate is based on the same rate of increase over the 3-year estimate as used in the farm class. Therefore, it is estimated that nonfarm and town residential consumers will average 300 kwh monthly in 1954, 450 in 1957 and 575 in 1962.

IRRIGATION

More than 90 percent of the farmers in the proposed service area irrigate 25 percent of the total land in farms. Gravity and ditch irrigation is general throughout the area. Pump irrigation is prevalent in the Baker Area.

Gravity or ditch irrigation is used in the valleys. The amount of available water depends upon the amount of snowfall in the mountains supplying the water. Because of the type of rock and soil formation, as well as the poor construction of ditches and extravagant methods of handling water, it has been estimated that only about one-quarter of the available water is actually effectively used. Because of the need for water to produce sufficient feed for the livestock, better methods for transporting the water are recognized as important goals in the area.

Studies of the area indicate that a sufficient supply of underground water is available in the vicinity of Baker. Irrigation wells presently located in this area are operated by diesel-fueled engines. Water from pumps has been used to supplement that obtained from surface at times when that supply is short. The shortage of water from ditches usually occurs at the height of the growing season.

The future for irrigation in this area lies primarily with sprinklers and, to a lesser degree, with pumps. In each of these cases electric power is the first requirement. To power pumps by motors using diesel fuel or B/T gas would be too costly in this area. When electricity is made available, water can be piped to fertile areas now considered too rolling or of too high elevation for irrigation. In each of these cases, loss of water will be at a minimum. The extent to which pump irrigation will be popular will depend upon the availability of ground water in areas where at present no study has been made as to determine its extent.

The summary of the requirements for irrigation loads for this proposed system is shown in Table VIII. Those who are presently irrigating are using diesel or gasoline engines as sources of power. Because of the high cost of diesel fuel and the gases, it is believed that all present users will switch to electricity. The total demand of 625 kw will be seasonal beginning in April and extending through September. In those cases where grain only is to be irrigated, the demand is likely to extend only through August.

Because of the lack of information needed, the kw and kwh requirement per farm cannot be determined. The figures in Table VIII are on a per well basis, and estimates of future requirement will be shown likewise.

Nevada 5 White Pine - September 8, 1952

TABLE VIII
SUMMARY OF IRRIGATION REQUIREMENTS

	<u>Existing</u>	<u>Proposed</u>	<u>Future</u>
Number of Wells	19	25	44
Acres to be Irrigated	2,215	2,180	4,395
Alfalfa	1,030	890	1,920
Grain	705	1,290	1,895
Hay	390	---	390
Seed	60	---	60
Corn Silage	30	---	30
Average Acres per Well	117	87	100
Kw Requirement	272	353	625
Average Kw per Well	14.3	14.1	14.2
Kwh Requirement	401,622	556,231	957,853
Average Kwh Requirement	21,138	22,249	21,769

Source: Section 8, Application.....for Loan of Funds.....December 1951.

OTHER CLASSES OF CONSUMERS

Other classes of consumers to be served by the proposed cooperative include small and medium commercial establishments and schools and churches.

Small commercial consumers are of the variety shown in Figure 2. A sample of these indicated probable future loads to be as follows:

<u>Name of Commercial</u>	<u>Estimated</u>	
	<u>Kw Demand</u>	<u>Average Monthly Kwh</u>
Lehman Caves Nat'l Monument	35	2,083
Garrison Store	6	1,250
Rowley's Service Store	6	830
Baker Garage	5	730
Baker Store	4	600
Osburn Club	4	600
Ryans Club Service Station	4	600
Thelma's Cafe	4	600

Nevada 5 White Pine - September 8, 1952

Medium commercial consumers include:

	<u>Estimated^{1/}</u>	
	<u>Max. Kw.</u>	<u>Ave. Mo.</u>
	<u>Demand</u>	<u>Kwh</u>
Combined Metals Reduction Company	75	13,500
Mount Wheeler Mines, Inc.	75	13,500
Minerva Scheelite Mining Co.	50	7,500
Minerva Scheelite Mining Co.	40	10,000

^{1/} As indicated in the application.

The estimated kw demand and kwh consumption for commercial and industrial consumers is likely to be attained upon energization or shortly thereafter.